



GUIDE FOR

**POWER SERVICE FOR MARINE AND OFFSHORE
APPLICATIONS**

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**American Bureau of Shipping
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Foreword

Power vessels are power plants installed on marine or offshore vessels (e.g., barges, ships, offshore installations, mobile offshore units, and converted vessels) that offer a quick and economic method of providing power to remote locations. To meet the increasing global demand, this Guide has been developed to provide requirements on design, construction, and survey for class review and approval of power vessels. This Guide is for the use of designers, builders, owners, and operators and specifies ABS requirements for obtaining the classification notation **Power Service**.

This Guide is applicable to power barges, power ships, power offshore installations (OI), power mobile offshore units (MOU), which includes self-elevating units (SEU) and column-stabilized units (CSU), and power converted vessels. Power vessels can be equipped with single or multiple gas turbines, reciprocating diesel or gas engines, or boilers for power generation.

In this Guide, the requirements of the power generation and distribution equipment installed on board are associated with an optional notation. Design and installation requirements for power generation and distribution equipment included in this Guide are based on existing industry practices that are deemed to provide an adequate level of safety. The application of this Guide by ABS will not prevent the use of technological approaches that can demonstrate an acceptable level of safety.

Power generation and distribution equipment designed, constructed, and installed in accordance with the requirements of this Guide on an ABS classed vessel, barge, offshore installation, or mobile offshore unit, under ABS review and survey, will be classed and identified in the *Record* by the optional notation **☒ Power Plant**.

This Guide is to be used in conjunction with other Rules published by ABS and recognized international Regulations.

This Guide becomes effective on the first day of the month of publication.

Users are advised to check periodically on the ABS website www.eagle.org to verify that this version of this Guide is the most current.

We welcome your feedback. Comments or suggestions can be sent electronically by email to rsd@eagle.org.



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SECTION 1 Scope and Conditions of Classification

1 Classification

The requirements for conditions of classification are contained in the separate, generic *ABS Rules for Conditions of Classification (Part 1)* and *ABS Rules for Conditions of Classification – Offshore Units and Structures (Part 1)*. Additional requirements specific to power vessels including power barges, power ships, power offshore installations, power mobile offshore units, and power converted vessels are contained within this Guide.

3 Application

This Guide covers new construction of power vessels including power barges, power ships, power offshore installations, and power mobile offshore units as defined in Subsection 1/9.

This Guide has been developed for classification requirements specific to design, construction, and survey of power vessels. The following base ABS Rule sets, as applicable for the vessel's base Class notation, apply in full for design, construction, and survey of the vessel, except as modified herein:

- The *ABS Rules for Building and Classing Steel Barges (Barge Rules)* are to be complied with for power barges intended for ocean service, as applicable.
- The *ABS Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways (River Rules)* are to be complied with for power barges intended for river service, as applicable.
- The *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)* are to be complied with for power ships, as applicable.
- The *ABS Rules for Building and Classing Offshore Installations (Offshore Installations Rules)* are to be complied with for fixed power offshore installations, as applicable.
- The *ABS Rules for Building and Classing Floating Production Installations (FPI Rules)* are to be complied with for floating power offshore installations, as applicable.
- The *ABS Guide for Building and Classing Mobile Offshore Units (MOU Guide)* is to be complied with for power mobile offshore units including self-elevating units (SEU) and column-stabilized units (CSU), as applicable.
- The *ABS Guide for Floating Offshore Liquefied Gas Terminal (FLGT Guide)* is to be complied with for gas power vessel offshore terminals utilizing stored liquefied gas, as applicable.

This Guide is also applicable for the conversion of existing vessels. Applicable base *ABS Rules* are to be complied with for power converted vessels.

This Guide has also been developed to provide requirements for the design, construction, installation, and survey of power generation and distribution equipment on power vessels.

5 Class Notations

5.1 New Construction

Power vessels complying with the full requirements in Sections 1 to 4 and 6 in this Guide may be classed and distinguished in the *Record* by adding the classification notation **Power Service**. The vessels will maintain their base rule notations such as barge, floating offshore installation, etc. For example, **✕ A1 Barge, Power Service** for ocean power barges; **✕ A1 Barge, River Service, Power Service** for river power barges.

If the power vessel uses LNG or LPG as a fuel source and is in compliance with Subsection 3/5, an optional notation **(LNG)** or **(LPG)** may be added to the notation.

Power generation and distribution equipment, systems, subsystems, and components that have been built, installed, and commissioned to the satisfaction of the Surveyors to the full requirements in Sections 5 and 6 of this Guide, where approved and reviewed by the Committee, may be classed and distinguished in the *ABS Record* by the optional notation **☒ Power Plant**.

Note: The mark **☒** (Maltese-Cross) signifies that the vessel or system was built, installed, and commissioned to the satisfaction of the ABS Surveyors.

5.3 Conversion of Existing Vessels

When an existing vessel is converted to a power vessel and it complies with the full requirements in Sections 1 to 4, and 6 of this Guide, it may be distinguished in the *Record* by adding the classification notation **Power Service**. The primary class notation should reflect the base rule set notation for the conversion.

For example, if an existing drillship is converted into a power vessel, the base rule set, the *FPI Rules*, is to be applied for this conversion and it would possess the notation **☒ Floating Offshore Installation (Ship-Type) (CI), Power Service**.

7 Submission of Plans

For the **Power Service** class notation, plans and documents specified in Sections 1 to 4 and 6, together with supporting calculations, as appropriate, are to be submitted before proceeding with the work.

For the optional class notation **Power Plant**, the submission of design plans and data is specified in Sections 5 and 6.

Plans are generally to be submitted electronically to ABS. However, hard copies will also be accepted.

7.1 Materials

This Guide is intended for power vessels designed and constructed of steels having properties as specified in the *ABS Rules for Materials and Welding (Part 2)*.

The use of steel or other materials that have properties different from those specified in the *ABS Rules for Materials and Welding (Part 2)* and the corresponding scantlings are subject to special consideration.

Where the power plant is fueled by natural gas the materials used in liquefied natural gas (LNG) tanks, gas piping, process pressure vessels, and other components in contact with cryogenic liquids or gases are to be suitable for the intended purpose and in compliance with Section 5C-13-7 of the *Steel Vessel Rules*.

7.3 Stability, Loading, and Operating Information

Information is to be submitted on ballast, fuel, supplies and hold arrangement and capacities; summary and distribution of fixed and variable weights for each reviewed condition; and information on all loaded and ballasted conditions in which the power barge, ship, floating offshore installation, or mobile offshore unit may be operated.

In accordance with the requirements contained in Subsection 2/3, stability calculations demonstrating that the power barge, ship, floating offshore installation, or mobile offshore unit meets the stability criteria in all loading and ballast conditions are to be submitted for review.

Information is to be submitted for intended operating location and any specific requirements based on applicable local/national codes and standards for review.

9 Definitions

Power Vessel. Power vessel includes power barge, power ship, power offshore installation, and power mobile offshore unit.

- *Power Barge.* A non-self-propelled vessel primarily intended to mount the power plant whose generated power is transferred or distributed externally.
- *Power Ship.* A self-propelled vessel primarily intended to mount the power plant whose generated power is transferred or distributed externally.
- *Power Offshore Unit.* Power offshore unit includes power offshore installation and power mobile offshore unit.
- *Power Offshore Installation.* An offshore installation (OI) including floating offshore installation moored or dynamically positioned on location or fixed offshore installation composed of a buoyant or non-buoyant structure supported by or attached to the sea floor, primarily intended to mount the power plant whose generated power is transferred or distributed externally.
- *Power Mobile Offshore Unit.* A mobile offshore unit, self-elevating unit (SEU) or column-stabilized unit (CSU), primarily intended to mount the power plant whose generated power is transferred or distributed externally.

Power Converted Vessel. A converted vessel primary intended to mount the power plant whose generated power is transferred or distributed externally.

Gas Power Vessel. A power vessel in which gas is employed as a fuel source.

Power Plant Systems. Industrial equipment provided onboard for generation and distribution of external power to shore or other vessels.

Hazardous Area. An area where flammable or explosive gases, vapors, or dust are normally present or likely to be present.

SOLAS. *International Convention for the Safety of Life at Sea, 1974*, as amended, applicable at the date of construction.

MODU Code. *IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units*

11 Operating Manual

An operating manual, consistent with the information and criteria upon which classification is based, is to be placed on board the power vessel for the guidance of the operating personnel. Insofar as classification is concerned, the operating manual is to include, as appropriate, the following information:

- i) A general description of the vessel, including major dimensions and lightship characteristics
- ii) Summaries of approved operation conditions for offshore power vessels including:
 - Limiting environmental conditions (e.g., wave height and period, wind velocity, current velocity, service temperature of the vessel)
 - Design deck loadings, mooring loads, icing loads, variable load, cranes, and types of helicopters for which the helideck is designed
 - Disposition (open or closed) of watertight and weathertight closures
 - Identification of “Restricted Service” or “Limited Service” conditions
- iii) Vessel Information:
 - General arrangement drawings
 - Watertight and weathertight boundaries, location of unprotected openings, and watertight and weathertight closures
 - Type, location, and quantities of permanent ballast

- Allowable deck loadings
- Capacity, centers of gravity, and free surface correction for each tank
- Hydrostatic curves or equivalent
- iv) Guidance for the maintenance of adequate stability and the use of the stability data
- v) Guidance for the routine recording of lightweight alterations
- vi) Guidance for the recommended sequence of emergency shut-downs, where applicable
- vii) Examples of loading conditions for each mode of operation and instructions for developing other acceptable loading conditions, including the vertical components of the forces in the anchor cables
- viii) Power Plant:
 - Details on power plant electrical connections to shore and to marine systems, as applicable
 - Guidance on power plant monitoring and associated safety systems
 - Guidance on startup, normal, and emergency operating procedures
 - Guidance on maintenance requirements
 - Guidance on periodic testing and maintenance requirements

The Operating Manual is to be in the language or languages required by the Flag State. If the language is not English, a translation into English is to be included and submitted to ABS.

The Operating Manual is to be submitted for review by ABS solely to verify the presence of the above information, which is to be consistent with the design information and limitations considered in the classification of the power vessel. ABS is not responsible for the operation of the vessel.

The Operating Manual required by this Subsection does not need to be in addition to that required by flag and coastal Administrations. The administration may require that additional information be included in the Operating Manual.

13 Alternatives for Power Service and Power Plant

13.1 Alternative Arrangements

ABS will consider alternative arrangements and designs that can be demonstrated, through either satisfactory service experience or a systematic analysis based on sound engineering principles, to meet the overall safety, serviceability, and design standards of this Guide.

13.3 Administration Requirements and National Standards

Requirements additional to those given in this Guide may be imposed by the National Administration with whom the vessel is registered or by the Administration within whose territorial jurisdiction the vessel is intended to operate.

Approval of structural fire protection, fire extinguishing equipment, and/or stability of the vessel by a National Administration, in accordance with requirements equivalent to those by class, may be considered as complying with the class requirements provided such approval can be satisfactorily documented.

Additionally, for power generation and distribution systems and equipment:

- i) ABS will consider special arrangements or designs of equipment, components, systems, or subsystems that can be shown to comply with standards recognized in the country, provided the proposed standards are not less effective.
- ii) When alternate standards are proposed, comparative analyses are to be provided to demonstrate an equivalent level of safety to this Guide.

13.5 Novel Designs

Power vessels with power generation & distribution systems and equipment that contain novel designs to which the provisions of this Guide are not directly applicable may be classed, when approved by ABS, on the basis that this Guide, insofar as applicable, has been complied with and that special consideration has been given to the novel design, based on the best information available at that time. Refer to the *ABS Guidance Notes on Review and Approval of Novel Concepts*.

15 References

Additional requirements from the following Rules, Guides, and Guidance Notes are referenced in this Guide:

- *ABS Rules for Building and Classing Steel Vessels (Steel Vessel Rules)*
- *ABS Rules for Building and Classing Steel Barges (Barge Rules)*
- *ABS Rules for Building and Classing Steel Vessels for Service on Rivers and Intracoastal Waterways (River Rules)*
- *ABS Guide for Building and Classing Mobile Offshore Units (MOU Guide)*
- *ABS Rules for Facilities on Offshore Installations (Facilities Rules)*
- *ABS Rules for Building and Classing Mobile Offshore Drilling Units (MODU Rules)*
- *ABS Rules for Building and Classing Floating Production Installation (FPI Rules)*
- *ABS Rules for Building and Classing Offshore Installations (Offshore Installations Rules)*
- *ABS Rules for Survey After Construction (Part 7)*
- *ABS Guide for Building and Classing Accommodation Barges (Accommodation Barge Guide)*
- *ABS Guide for Floating Offshore Liquefied Gas Terminal (FLGT Guide)*
- *ABS Guide for High Voltage Shore Connections*
- *ABS Guidance Notes on Review and Approval of Novel Concepts*

The additional requirements of the following codes and standards are referenced in this Guide:

MODU Code	<i>IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU Code)</i>
FSS Code	International Code for Fire Safety Systems (FSS Code)
SOLAS	International Convention for the Safety of Life at Sea, 1974, as amended.



SECTION 2 Hull Construction and Equipment

1 General

The ABS Rule set, as applicable for the vessel's base Class notation, applies in full for hull construction and equipment except as modified herein.

In general, for power barges designed for ocean or river services with power generation operation at a specific site, structural design requirements are to comply with the applicable requirements in Part 3 of the *Barge Rules* or Part 3 of the *River Rules*. For special design requirements to take account of the site specific environmental conditions, detailed structural analyses are to be submitted for ABS review and approval.

For power offshore installations, hull design requirements are subjected to special review and approval. The applicable requirements in Part 3 of the *Offshore Installations Rules* are to be complied with for fixed power offshore installations. The applicable requirements in Part 5 of the *FPI Rules* are to be complied with for floating power offshore installations.

For power mobile offshore units, including self-elevating units (SEU) and column-stabilized units (CSU), hull design requirements are subject to special review and approval. The requirements in Part 3, Chapter 2 of the *MOU Guide* are to be complied with, as applicable.

Hull interface structures are to comply with the applicable requirements of the appropriate base rule set. Where heavy power plant equipment is installed on the deck, details of hull interface scantlings are to be submitted for review and calculations are to be submitted to demonstrate the adequacy of the interface structure. Reference may be made to Section 5A-1-4 of the *FPI Rules*, as applicable.

3 Stability

In assessing the stability of power barges with accommodations, the requirements in Section 6 of the *ABS Accommodation Barge Guide* are to be complied with. For unmanned power barges, stability requirements will be in accordance with the *International Code on Intact Stability, 2008 for Pontoon* and flag Administration requirements, as applicable. Stability analysis demonstrating that the power barge meets the stability criteria are to be submitted for ABS review and approval.

For non-ship-type floating offshore installations, stability requirements in the Section Chapter 3, Section 3 of the *MOU Guide* are to be complied with, as applicable.

5 Mooring Systems

The purpose of the position mooring system in this Guide is to keep the power vessel on station at a specific site. The system includes mooring lines, anchors, mooring accessories, mooring equipment, and thrusters, where applicable.

For floating power vessels, the mooring system design is to comply with the applicable requirements in Part 6 of the *FPI Rules* if a power vessel is intended to be stationary at a specific site for long-term operations (i.e., five years or longer). For those that are moored to a jetty, or similar bottom supported structure, the jetty structure is the responsibility of the Owner, including compliance with coastal state requirements.

For floating power vessels under short-term operations at one site, the requirements of the mooring system in Chapter 3, Section 4 of the *MOU Guide* are to be complied with, as applicable.

7 Bottom Founded Power Vessels

For a power vessel intended to rest on the seabed, the effect of the foundation is to be considered in the structural analysis including uneven loading, sliding, etc. The effect of scouring and possible loss of bottom support is also to be considered as follows: for a broad mat type support, 20% of the bottom bearing area is to be considered unsupported.



SECTION 3 Machinery, Piping, and Electrical Systems

1 General

This Section is applicable to machinery, piping, and electrical systems utilized to support power vessel operations, excluding the power plant systems. The ABS Rule set, as applicable for the vessel's base Class notation, applies in full for machinery, piping, and electrical systems, except as modified herein.

For ship type power offshore installations, the applicable requirements in the *Steel Vessel Rules* are to be complied with. For power offshore installations other than ship shape, the applicable requirements in the *MOU Guide* are to be complied with.

Plans showing the general arrangement of all machinery spaces are to be submitted for review and/or approval.

3 Hazardous Areas

Power vessels may have hazardous areas due to permanent or temporary equipment on deck utilizing low flash point fuels. The area where such equipment will be installed is to be considered as a hazardous area, and electrical equipment, ventilation, and access to adjacent spaces in this area are to comply with the applicable requirements.

For gas power vessels, the applicable requirements in Section 5C-13-12 of *Steel Vessel Rules* are to be complied with.

For power offshore installations, 4-8-4/27 of the *Steel Vessel Rules* is to be complied with.

5 LNG or LPG as Fuel

Where natural gas or petroleum gas is used as a fuel source for power vessels and the optional **Power Plant** notation is requested, the classification of the arrangements, machinery, equipment, and containment systems, etc. are to meet the requirements and safety principles of Part 5C, Chapter 13 of the *Steel Vessel Rules*, as applicable. If the optional **Power Plant** notation is not requested, the entire power generation system need not comply with the requirements of Part 5C, Chapter 13 of the *Steel Vessel Rules*. However, the arrangements, systems and equipment are to meet the safety requirements and principals of the following Sections of the *Steel Vessel Rules*:

- Goal and Functional Requirements: 5C-13-3/2
- Risk Assessment: 5C-13-4/2
- Limitation of Explosion Consequences: 5C-13-4/3
- Machinery Space Concepts: 5C-13-5/4
- Fuel Containment System: 5C-13-6, or equivalent
- Fire Safety: 5C-13-11
- Explosion Prevention: 5C-13-12
- Electrical Installations: 5C-13-14

7 Marine Systems Powered by the Power Plant

When marine systems are powered via a power plant, the following additional conditions are to be met:

- i)* Demarcation of the electrical distribution system for marine systems is to be clearly indicated.
- ii)* Where the main source of electrical power is necessary for propulsion and steering of the vessel, the system is to be so arranged that, in the event of the loss of any one of the generators or transformers in service, the electrical supply to equipment necessary for propulsion and steering will be maintained or restored.
- iii)* A self-contained emergency source of electrical power is to be provided, as required by the base Rule set (e.g., *Steel Vessel Rules*, *MODU Rules*, *Barge Rules*, etc.), so that in the event of a failure of the main source of electrical power, the emergency source of power will become available to supply power to services that are essential for safety in an emergency.
- iv)* Instrumentation is to be provided at the marine system switchboard showing energized status of the connected power plant switchboard. Means are to be provided for checking the polarity (for DC) or the phase sequence (for three-phase AC) of the power plant supply in relation to the marine system.



SECTION 4 Safety Systems

1 General

Power vessels are to meet the requirements of the applicable base ABS Rule set, except as modified by this Section, with regard to fire and safety measures and features as well as lifesaving appliances and equipment.

For manned power barges without accommodation, the requirements of flag state, coastal state, or other applicable regulatory requirements with respect to safety (e.g., fire protection and protection of crew) are to be complied with. For unmanned power barges, safety systems are to be evaluated based on the operational profile of the barge. Where a review of all or part of the requirements covered in this Section has been conducted by the Administration of the State whose flag the barge is entitled to fly and found acceptable, the same will be acceptable to ABS. The designer or builder is to submit evidence that the Administration has reviewed the arrangements and that the details are acceptable to that Administration.

3 Structural Fire Protection

For power barges with accommodation of more than 36 persons, excluding members of the crew, the structural fire protection is to comply with Section 5-1/1 of the *MOU Guide*, as applicable.

For power offshore installations, the applicable requirements in Section 3-8/9 of the *Facilities Rules* are to be complied with.

5 Fire Protection Systems and Equipment

For power barges with accommodation, the applicable requirements in Chapter 5, Section 2 of the *MOU Guide* are to be complied with.

For power offshore installations, the requirements of flag state, coastal state or other applicable regulatory requirements are to be complied with and additional requirements may be necessary on a case-by-case basis.

7 Lifesaving Appliances and Equipment

Power barges with facilities to carry not more than 36 persons, excluding members of the crew, as long-term moored to jetty or similar bottom supported structure, are to comply with the requirements of flag state, coastal state or other applicable regulatory requirements are to be complied with. Alternatively, these barges are to comply with Part A and Section I of Part B of Chapter III of 1974 *SOLAS* as amended and with the applicable provisions of the *International Life Saving Appliance (LSA) Code*. For power barges intended for the accommodation of more than 36 persons, excluding members of the crew, and power mobile offshore units, lifesaving appliances and equipment are to comply with Chapter 10 of the *IMO Code for the Construction and Equipment of Mobile Offshore Drilling Units (MODU Code)* and the relevant sections of the *International Lifesaving Appliance (LSA) Code*. Special consideration will be given to power barges that are moored to a jetty, or similar structure.

For power offshore installations, the requirements in 3-8/15 of the *Facilities Rules* are to be complied with, as applicable.



SECTION 5 Power Generation and Distribution Systems and Equipment

1 General

This Section applies to installations seeking the optional classification for the design, construction, installation, and survey of power generation and distribution equipment for exporting power to external loads. Vessels whose systems and components meet the full requirements of this Section may receive the optional notation **Power Plant**.

The scope of this Section includes power generation and distribution systems and equipment installed on board power vessels. Power plant systems may be used to provide power to vessel marine services and the arrangement is to be in accordance with Subsection 3/7.

3 Submissions of Design Plans and Data

The following Subsections describe the minimum design plans and data submission requirements for associated power generation and distribution systems, subsystems, equipment and/or components. Additional details may be required for submittal.

- i) The submitted design plans and data are to be in accordance with the requirements of this Guide.
- ii) The design plans and data as specified in this Guide are to be generally submitted electronically to ABS. However, hard copies will also be accepted.
- iii) All plan submissions originating from designers or manufacturers are understood to be made with the knowledge of the primary contracting party.
- iv) All plan submissions originating from manufacturers are understood to be made with the cognizance of the primary contracting party. A fee may be charged for the review of plans that are not covered by the contract for Classification.

3.1 Electrical Systems and Components

The following plans and data are to be submitted for review:

- i) *One Line Diagram* – One line diagram of main and emergency power distribution systems to show:
 - *Generators*: kW rating, voltage, rated current, frequency, number of phases, and power factor
 - *Motors*: kW or hp rating, voltage, and current rating
 - *Motor controllers*: type (direct-on-line, star-delta, etc.), disconnect devices, overload and undervoltage protections, and remote stops, as applicable
 - *Transformers*: kVA rating, rated voltage, and current, winding connection
 - *Circuits*: designations, type and size of cables, trip setting and rating of circuit protective devices, rated load of each branch circuit, emergency tripping, and preferential tripping features
 - *Batteries*: type, voltage, rated capacity, conductor protection, and charging and discharging boards

- ii) *Schematic Diagrams* – Schematic diagrams for the following systems are to be submitted. Each circuit in the diagrams is to indicate type and size of cable, trip setting and rating of circuit protective device, and rated capacity of the connected load.
 - Interior communications
 - General emergency alarm
 - Intrinsically safe systems
 - Fire detection and alarm system (if independent from vessel marine systems)
- iii) Short Circuit Data submittals as documented in 4-8-1/5.1.3 of the *Steel Vessel Rules*
- iv) Protective Device Coordination Study submittals as documented in 4-8-1/5.1.4 of the *Steel Vessel Rules*
- v) High Voltage Systems submittals as documented in 4-8-1/5.1.7 of the *Steel Vessel Rules*. High voltage in this Guide refers to voltages above 1000 V. For voltages exceeding 15 kV, special consideration will be given.
- vi) Installation plans submitted as documented in 4-8-1/5.3 of the *Steel Vessel Rules*
- vii) Electrical Equipment submittals as documented in 4-8-1/5.5 of the *Steel Vessel Rules*

3.3 Piping Systems

The following plans are to be submitted for review as referenced in 4-6-1/9 of the *Steel Vessel Rules*, as applicable:

- Power plant machinery space arrangement, including locations of fuel oil tanks
- Booklet of standard details (see 4-6-1/9.5 of the *Steel Vessel Rules*)
- Compressed air system
- Cooling water systems
- Exhaust piping (for boilers, incinerators, and engines)
- Fuel oil systems, including storage tanks, drip trays, and drains
- Hydraulic and pneumatic systems
- Lubricating oil systems
- Sea water systems
- Vent, overflow, and sounding arrangements
- Steam systems
- Steam piping analyses, as applicable
- Tank venting and overflow systems

3.5 Internal-Combustion Engines and Turbines

Technical submissions for internal-combustion engines are to include, but are not limited to, the requirements of 4-2-1/1.9 of the *Steel Vessel Rules*.

Technical submissions for gas turbines are to include, but are not limited to, the requirements of 4-2-3/1.5 of the *Steel Vessel Rules*.

Technical submissions for steam turbines are to include, but are not limited to, the requirements of 4-2-4/1.5 of the *Steel Vessel Rules*.

Alternatively, technical submissions based on the requirements of applicable industry standards may be acceptable after ABS review and approval.

3.7 General Equipment Details

Plans and data for equipment and components are to provide the following, as applicable:

- i)* Model and size
- ii)* Design specifications, including design codes, standards, and references
- iii)* Design parameters: loads, temperature, environmental conditions, etc.
- iv)* Design analysis and/or calculations, as applicable
- v)* Dimensional details and drawings
- vi)* Fabrication details and welding configurations
- vii)* Material specifications and material properties

5 Design Requirements

5.1 General Arrangement and Equipment Layout Drawings

General arrangement and layout drawings are to denote:

- i)* The layout of the power generation machinery with essential auxiliaries, specifications of main equipment with information on manufacturer's name, type, rating, and number of the equipment
- ii)* General arrangement of the switchboards and distribution boards

5.3 Certification and Classification Requirements

In general, power generation and distribution machinery and electrical systems are to be built and constructed in accordance with ABS Rules or recognized industry standards. ABS design review verifies that the design of systems, subsystems, equipment, and/or components meets the requirements of this Guide.

5.5 Loss of Export Load

Power generating installations are to be arranged and provided with necessary equipment so that in the event of a disconnection of all transmission lines and total loss of external load the system can be removed from service without damage. Additionally, the entire plant is to be arranged to be able to be returned to service without external assistance to the power vessel.

5.7 High Voltage Shore Power Connection

Vessels equipped with a high voltage shore connection designed to power the vessel with the shore power alone, enabling the shipboard generators to be shut down while in port, are to comply with the requirements given in the *ABS Guide for High Voltage Shore Connection*.

5.9 Protection from Shore Distribution Faults

If the power vessel provides power to shore, which may also augment other shore power generation sources as a parallel power source, the connection from the power vessel to the shore distribution system is to be protected from shore power faults, frequency, and voltage variations in accordance with the applicable industry standard for the country where it is providing power.

5.11 Environmental Suitability

Design of system and components for power plant applications are to be suitable for the inclination and vibration requirements of the host vessel or unit.



SECTION 6 Surveys

1 General

The requirements of Subsections 6/3 and 6/5 are provided for surveys during and after construction for power vessel classification of **Power Service**. The requirements of Subsection 6/7 are provided for surveys during and after construction for the optional **Power Plant** notation.

3 Testing, Trials, and Surveys during Construction

The ABS Rule set, as applicable for the vessel's base Class notation, applies in full for testing, trials, and surveys during construction, except as modified herein.

3.1 Hull Trials and Testing

For power offshore installations, the requirements in Part 1, Section 2 of the *Offshore Installations Rules* are to be complied with for fixed power offshore installations. The requirements in Part 7, Chapter 1 of the *FPI Rules* are to be complied with for floating power offshore installations.

3.3 Machinery Trials and Testing

For power vessels, the machinery systems are to be tested in accordance with the appropriate sections of the applicable Rules and Guides specified in Section 3/1 of this Guide.

5 Surveys after Construction

The ABS Rule set, as applicable for the vessels' base Class notation, applies in full for surveys after construction, except as modified herein.

The requirements in Part 1, Section 3 of the *Offshore Installations Rules* are to be complied with for Survey after Construction for fixed power offshore installations in this Guide. The requirements in Part 7, Chapter 2 of the *FPI Rules* are to be complied with for Survey after Construction for floating power offshore installations in this Guide.

The requirements in Section 7-2-7 of the *FPI Rules* are to be complied with for Drydocking Surveys or Equivalent, for a floating power vessel intended to be stationary at a specific site for long-term operations (i.e., five years or longer) including UWILD, cathodic protection, mooring system, etc.

7 Surveys for Optional Power Plant Notation

Where a barge is assigned the optional notation **Power Plant**, the following survey requirements are to be complied with during and after construction.

7.1 Surveys during Construction and Commissioning

This Subsection provides requirements for surveys during manufacturing, installation, and start-up (commissioning) of power generation and distribution systems installed on barges, or offshore installations, or mobile offshore units.

During construction, ABS Surveyors are to be provided access to manufacturers' or fabricators' facilities to witness construction and/or testing as required by this Guide, and the applicable design codes and/or standards.

The manufacturer/fabricator is to contact the ABS Surveyor to make necessary arrangements to examine systems, subsystem, equipment, and/or components.

The purpose of the initial onboard survey of equipment is to verify that the installation is in compliance with the ABS approved plans, with particular emphasis on examination of the following, as applicable:

- i) Location of equipment in relation to any hazardous areas
- ii) Equipment orientation on the vessel or unit, equipment structural arrangements, supporting foundations, securing details, and protective coating
- iii) Visual and/or NDT examination of assembled and installed equipment, attachment on board, including underdeck support
- iv) Hook-up and integrity of equipment piping, electrical, machinery, and ventilation system, including watertight penetrations and integration with associated ship systems
- v) Piping system visual examination, NDT, and pressure test per applicable Rules or codes
- vi) Testing of pressure relief and safety valves for hydraulic/pneumatic systems on board
- vii) Visual examination of electrical equipment, wiring connections, cable routing, earthing, cable penetrations, and distribution panels to include testing of electrical systems and insulation tests
- viii) Lighting systems examination and test
- ix) Ventilation systems examination, ducting arrangements, and penetrations, damper arrangements, operational tests
- x) Control systems, safety devices, and shutdowns to be tested to the satisfaction of the attending Surveyor
- xi) Fire/Safety measures such as fire control plan, EEBDs, lifesaving appliances, as applicable, crew protection, general alarm/pa, fire detection, portable extinguishers, escape arrangements, main and emergency lighting, and any required emergency shutdowns
- xii) Compliance with any special requirements from the flag Administration, local codes, or regulations.
- xiii) Commissioning of communication equipment related to power plant operation
- xiv) All power plant systems and equipment to be checked for proper operation

7.3 Surveys after Construction

Surveys after construction of power generation and distribution systems installed on power vessels are mandatory for maintenance of the **Power Plant** notation.

Surveys after construction are to be in accordance with the applicable *ABS Rules for Survey after Construction (Part 7)* based on the notation assigned to the vessel.

7.3.1 Annual Surveys

In addition to the surveys referenced in the *ABS Rules for Survey after Construction (Part 7)*, the following are to be carried out in the presence of an ABS Surveyor on an annual basis, as applicable:

- i) Examination of structure and hull connection weld points
- ii) Satisfactory operational test of all emergency stops, controls, and remote controls
- iii) Review of calibration record, operations manual and logbooks, and insulation resistance log
- iv) Examination and testing of fire/safety alarms, detectors, and ventilator dampers
- v) Testing of all means of communication
- vi) Examination of all piping systems
- vii) Functional tests of equipment integrated or associated with vessel's systems
- viii) Examination and testing of electrical systems and related equipment

- ix)* Satisfactory operational test of all vessel equipment alarms
- x)* Compliance with any special requirements from the flag Administration, local codes, or regulations

If the ABS Surveyor finds reason to recommend repairs or additional surveys, notice will be immediately given to the Owner or his representative so that appropriate action may be taken.

7.3.2 Special Survey (Every 5 Years)

In addition to the applicable requirements noted in 6/7.3.1 above for Annual Surveys, the following is to be carried out in the presence of an ABS Surveyor:

- i)* Examination of structure and hull connection weld points, supplemented by NDT of the connection welds
- ii)* Examination of power plant equipment wiring, wireways, junction boxes, and electrical panels for damage, corrosion, or loose connections
- iii)* Examination and testing of insulation resistance of motors and cables related to power systems and equipment
- iv)* Calibration of essential safety alarms, detectors, and equipment
- v)* Satisfactory operational test of all emergency stops, controls, and remote controls
- vi)* Satisfactory operational test of all equipment alarms